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An Autobiography and Some Reminiscences of the Late August Fendler. I.

EDITED BY WM. M. CANBY.

Brief notices of the late August Fendler have appeared in several scientific periodicals, but scarcely such as so excellent a man and one so useful to science deserved. Feeling this, a fuller account, consisting of extracts from his correspondence and some personal reminiscences, was prepared by the writer. After this had been done, it was found that, at Prof. Eaton's suggestion, Mr. Fendler had written and sent to him the autobiography which has been kindly furnished, and is here given. The former account, revised and enriched with further extracts from his letters to Professors Gray and Eaton, is appended.

AUTOBIOGRAPHY.

August Fendler, the only child of Mathias Fendler, was born on the 10th day of January, 1813, at the town of Gumbinnen, in the most eastern part of Prussia. When he was about six months old his father, who by trade was a turner in wood and ivory, died. Two years later his mother married again. Little August's parents being possessed of but scanty means, could not do much for the boy in the way of education. Hence it happened that his school training was for a number of years confined to the most rudimental establishment, scarcely deserving the name of a school. When about twelve years old he was sent to the "Gymnasium," a kind of preparatory school for the University. Here he showed more aptitude for mathematics than for Greek and Latin, and after a term of four years his parents, becoming financially embarrassed, were obliged to take him from school. Being apprenticed to the town clerk's office, he soon found that the kind of writing to be done here was to him but a time and spirit-killing employment, during which the longing for a visit to foreign countries grew daily stronger.

At the end of his apprenticeship his first chance for traveling presented itself. He received an offer from a distinguished physician to accompany him in the capacity of clerk during a journey of inspection to be made with regard to the quarantine stations along the Russian frontier of Prussia, which the much dreaded cholera was then, for the first time, fast approaching in its westward course through Europe. F. accepted the offer most readily, and as the

time of starting on this little trip was fixed upon for the next morning, he could not sleep an hour all night for excitement and joy. They had not been long on their journey when the physician received the alarming news that the cholera had already made its appearance in a large Prussian village on the frontier. To this point they hastened immediately. The cholera made sad havoc among the population of the village, and F. was soon surrounded by cholera patients, an unusually great percentage of whom died. The ravages of the cholera in this place finally abated, and F. went home.

He was now troubling his mind more than ever with the question what trade or occupation to choose that would give him a good chance for traveling. If he had but known that there was such an occupation as that of a collector of plants, and that from the sale of them he could clear his traveling expenses, how happy would he have been to prepare himself for it, the more so as he was fond of objects of vegetation. But no such information had ever reached him; he had seen no books describing the species of plants of any locality, and the schools had been silent on the subject.

Having a preference for a trade based upon chemistry, and having been assured that the tanning and currying trade was *the* one that would take him safely through all Europe and America, he became an apprentice to it, and during two years of steady hard work learned practically most of the various manipulations, disgusting though some of them are to most persons, and trying as they were to his rather slender and light frame of body. He got over all the objections in a most cheerful manner, looking constantly to the future chances for travel offered by his trade.

Meanwhile F. found out that there existed in Berlin a kind of Polytechnic school, the Royal *Gewerbe schule;* in which young artisans, who showed an ability for readily acquiring the physical sciences, were to receive not only free instruction, but likewise an annual stipend of three hundred thalers for three years. The candidates for these favors to be selected, after due examination, two or three from each province of the kingdom. Arrived at this school, the pupils found soon that the vigorous and rapid course of instruction tasked all their mental powers. A small proportion of their number only were able to avail themselves of the whole three years' instruction, all the rest being dismissed as unfit, either at the end of the first or second year.

In the fall of 1834 F. was admitted a pupil to the Royal *Gewerbe schule*, but the continued sedentary life, combined with the strain of mind in studying till late at night, told plainly that this mode of life did not agree with his health. Advised by his physician to desist from any further exertions at this school, he, at the end of the first year, asked for his dismission, which was granted, accompanied by a testimonial certifying to his "good and very good progress in all the various branches of instruction."

In the autumn of 1835 F., with knapsack on his back, started from Berlin in the capacity of a traveling artisan (*Handwerksbursche*), passing through parts of Silesia, Saxony to Frankfort, and down the river Rhine, working in several places at his trade, and finally going to Bremen. Thence early in the spring of 1836 he embarked for Baltimore, Maryland, where he arrived with only a couple of dollars in his pocket. In Philadelphia he worked in a tanyard for a few months, but found the work too hard, and after having visited the coal districts of Pennsylvania, he went to New York late in the fall and without money, friends, or employment at his trade, was obliged to go to work in a lamp factory and learn a variety of handicraft more agreeable to him than those of the tanyard. While at New York he witnessed the arrival of the first ocean steamers, the Sirius and the Great Western. They were side-wheel steamers, and were hailed most enthusiastically by the people of New York. The great money crisis and panic of 1837 depressed the lamp manufacturing business to such an extent that, one after another, all the journeymen of his shop, as well

as the apprentices, had to quit. F. was the last one to leave his employer, until finally in the spring of 1838 the shop was shut up altogether.

F. having made up his mind to go to St. Louis, Missouri, the then "Far West," started as early as possible. The best and quickest route he could find at that time was the following: from New York up the Hudson river to Albany by steamer; then to Buffalo by canal, which took seven or eight days; thence by steamer to Cleveland, Ohio; thence by canal to Portsmouth, on the Ohio river; thence down the Ohio and up the Mississippi by steamboat to St. Louis. The whole journey from New York to St. Louis required thirty days, and at the most economical rate, by taking deck-passage on the steamers, could not be made for less than thirty dollars.

At St. Louis, which at that time had but 13,000 inhabitants, F. got employment as lamp maker with a man who had just commenced making spirit-gas for lighting public houses, as the manufacture of coal-gas had not reached so far west. F.'s wages were good, but getting dissatisfied with the poor tools and the cold and open room he had to work in at the approach of winter, he directed his thoughts towards the sunny South, and resolved to leave St. Louis about Christmas time in 1838. As all the river steamers were ice-bound, he took up his staff and knapsack, the same he used to carry in the old country, and crossing the Mississippi, he commenced his solitary walk through the then thinly settled forests of Illinois, the cane-brakes of Kentucky, and part of Tennessee, where he fell in with two other men bound for New Orleans. As no steamboats from northern ports had yet been able to break the great ice barrier below the mouth of the Ohio river, the three wayfarers joined in buying an old skiff, and in it floated down the great river. Towards evening the same day a steamboat, the first to break the ice, was espied by them coming down, was hailed, boarded, and the skiff abandoned.

Arrived at New Orleans, the talk about Texas induced F. to seek adventures still farther west. Embarked in a steamer and arrived at Galveston in January, 1839. Galveston island at that time contained about a dozen poor-looking houses scattered about its low and sandy surface. From Galveston he went to Houston, the capital of Texas. The government of Texas then granting to every immigrant a "headright" of 320 acres of public land, F. applied for one and received it, but in order to have it selected and surveyed he was required, well armed, to join the surveyors, in order to strengthen their party against any premeditated attack from the wild Comanches who, it was feared, might at any time pounce upon them. But having no rifle, he could not join the surveying party, and hence had to leave his grant of land unselected.

His stay of twelve months in Texas was full of exciting incidents. Having roamed, for the most part singly, the country as far as to the then uninhabited spot (soon, however, to be surveyed by order of the government) where now the new capital of Austin stands, and suffering from a severe attack of bilious fever, F. returned to the nearest settlement, and subsequently to Houston, just in time to be an unwilling witness to the dreadful and distressing sights of the unprecedented ravages of the yellow fever during a period of four months in the summer and fall of 1839. At last, dissatisfied with the country, nearly empty in purse, and broken down in health, he left for Illinois, where for some time he was engaged in teaching school.

Autumn in North America, and especially in the Western States, always presented more charms to F.'s mind than any other part of the year. Hence in 1841, when autumn winds began to scatter the falling forest leaves, he was seized with an uncontrollable desire for solitary life in the wild woods, removed from the haunts of man, in short, for the independent life of a hermit. In his search for a proper place, he came upon a little village called Wellington, situated on the banks of the Missouri river, three hundred miles above St. Louis. Here he learned that an uninhabited island, two and a half miles long, called Wolf's Island, not very far below the village, was at his service.

Without delay, F. packed his little baggage, including some bed-clothes and cooking utensils, a rifle, an axe and some books, in a canoe, also taking along some provisions, and started for his new home. This island was densely wooded with gigantic trees. On the lower part of it, farthest removed from the village, was an old, dilapidated log cabin, the former abode of some wood-choppers. The upper part of the chimney was gone, so that a tall man standing on the outside of it could look down inside upon the low fire-place, from the burrows of which wild rabbits popped forth at the approach of man; part of the roof was gone, and the door carried off. There was plenty of game, however, especially wild turkeys. These latter had chosen the island as a roosting place for the night and as a place of safe retreat in daytime when chased on the mainland by hunters. In a so-called "turkey-pen" they were easily entrapped, and thus an abundance of excellent food secured. To return the borrowed canoe to its owner and to make one of his own was his first aim. So he went to work at a big trunk of a prostrate tree, and with an axe shaped part of it into proper form of a light canoe eight feet long.

Removed from the crowd, the hum and strife of men, his pastimes consisted alternately in trapping, hunting, reading, musing and meditating, and on mild and sunny days in paddling up a placid arm of the river, then turning round, lean idly back in his canoe, thus floating home again. Occupied in this way F. lived for about six months, enjoying the sweets of solitude with a satisfaction of inward peace of mind and bliss higher than he had expected—contented and happy as ever mortal man, similarly situated, can claim to be. His feelings of content would at times culminate into feelings of thankfulness, which then found vent in words akin to the soliloquy of Faust at his forest cave: "Spirit sublime! Thou unto me gav'st ev'ry thing I pray for."

Only once he met on the island with a human being, namely, with its owner, coming to see him. How long F. would have continued to live here is hard to say, if the great spring rise in the Missouri river, which began to overflow part of the island, had not taken place. When its waters rose to within a short distance of his cabin he thought 'twas time to leave, and entrusting himself and baggage to his frail canoe, was hurried along at no mean speed by the precipitate rush of the foaming and rapidly swelling stream. Dodging floating logs and broken ledges of ice, he expected every moment to be swamped by the high waves caused by a stiff breeze blowing up stream. To land his tiny craft amidst eddies and whirlpools at Lexington, ten miles below the island, was, however, the most perilous part of the venture.

In 1844 F. sailed for Europe on a visit home. At Koenigsberg he got acquainted with Ernst Meyer, Professor of Botany at the University, who first intimated to him that a certain number of sets of dried specimens of plants for the herbarium might be disposed of at a reasonable price, and advised him on his return to the Western United States to collect and send them on, for sale, to the Professor's address.

On his return to America and to St. Louis, F. assiduously began to collect plants, and took the different species to Dr. Engelmann, who furnished him with their scientific names. Different parts of the country, between Chicago and New Orleans, were visited by him for the purpose of collecting. Dr. Engelmann observing the zeal of F. for his new occupation, recommended him to Dr. Asa Gray in 1846, during the war between Mexico and the United States. The latter being about to send troops to Santa Fe, New Mexico, Dr. Gray furnished F. with a letter of recommendation from the Secretary of War, by means of which he got free transportation for himself, his collections and luggage. F. arrived at Santa Fe late in the fall of the year, when vegetation on the most interesting part of his route was already dried up. Collecting during the following spring and summer, he was, to his great sorrow, obliged to return to

St. Louis in the fall of 1847, his means of subsistence having become exhausted.*

In the spring of 1849 F. started on another collecting expedition over the western plains. This time he intended to visit the Great Salt Lake region. To him the year 1849 proved most disastrous, for in crossing the plains he lost, in the Little Blue river, by a flood that came suddenly upon him, all his drying paper, besides many other things needful on his intended tour, as well as his principal means of transportation, so that he was forced to wait at Fort Kearney for a chance to return to St. Louis. Arrived at the latter place, he found that all his worldly goods, all his collections, all his books, and worse still, all the journals of his travels had been destroyed by the great conflagration that, at the same time, laid the best business quarter of St. Louis into ashes during his absence.

At the close of 1849 F. embarked at New Orleans for Chagres, on the Isthmus of Panama, and after having collected for four months at and above the mouth of the Chagres river, went by the way of New Orleans to Arkansas, collecting plants during the summer at Camden, on the Washita river. The fall of 1850 found him settled at Memphis, Tennessee, introducing and carrying on for three years the camphene-light business in that town and collecting for his herbarium as time would permit. As soon as he found that the introduction of coal gas, in the fall of 1854,† made his camphene business unprofitable, he was on the move again and went by way of New York to La Guayra, Venezuela, then up to Caracas, and after a few months stay in the latter place to Colonia Tovar, situated 6,500 feet above the sea. Here, unattended by any one in his four years' botanical rambles, he scaled the lonely crests and explored the hidden recesses of many a forest-covered mountain range, and through trackless wilds and along the margin of foaming rivulets gathered lots of Phænogamous plants, as well as Ferns, Mosses and Fungi. He also paid attention to meteorological phenomena, parts of his observations being printed in the annual report of the Smithsonian Institution for the year 1857.

Having returned to Missouri F. acquired, in 1864, near Allentown, a tract of land densely wooded, which, with the assistance of his half-brother, he began to clear and cultivate. Toiling here for seven years to improve his new homestead, he finally sold it, in 1871, and left for Europe in the spring following to pay once more a visit to his old home with a view to abide there. America, however, had taken too strong a hold on his affections, the more so as he had been for twenty-four years a naturalized citizen of the United States. He returned to its shores in 1873, and, after looking around for some time, settled at Wilmington, Delaware, which he intended to make his final and permanent home. Yet this was not to be. Fearful attacks of acute rheumatism, endangering his life, forced him, four years after, again to break loose and go in search of a more genial climate in more southern latitudes. In June, 1877, he landed in a feeble state of health at Port-of-Spain, on the Island of Trinidad, where he has been busy ever since in making collections of Ferns and Phænogamous plants, as well as Mosses.

*About this time (July 25, 1848,) we find the earliest letter to Professor Gray which has been preserved. It gives a pitiful account of his privations and losses, stating, among other facts, that his brother had been obliged to enlist in the army on account of poverty. Later in the year he wrote again, proposing, if proper pecuniary encouragement was secured, to make a collecting tour on the Isthmus of Panama and in California. No arrangement was made, however. In a letter dated August 11, 1853, he states that many of the sets of his Santa Fe collections, which had been sent to Europe, were still unsold. Professor Gray's classic *Plantæ Fendlerianæ* has long since made these invaluable, and many botanists would gladly purchase them now.

†This date should be 1853, as we find by his letters that he left Memphis on the 16th of November, 1853, and on December 24, of the same year, sailed from New York for Venezuela. The extracts from his correspondence given hereafter illustrate his life at this and subsequent periods.

His notes and observations on botanical subjects are scattered in letters to his correspondents. Besides Botany, Meteorology is one of F.'s favorite studies, and wherever he resided, since 1849, he made daily observations with regard to it.

While at Wilmington F. published a little work entitled "The Mechanism of the Universe," and also translated Goethe's "Faust" from the German original into the English language. This translation is yet in manuscript form.

The Myxomycetes—their collection and preservation.

BY GEO. A. REX.

In the increasing interest manifested by American botanists in the study of mycology, the curious and anomalous Myxomycetes, or slime moulds, have not received the attention which they merit. The study of this border-land group will amply repay those who undertake it, for not only the wonderfully interesting life history and development, but the exquisite structural beauty also, of the matured sporangia of many of the orders, render them objects of peculiar interest.

The true position of the Myxomycetes is yet a disputed point with biologists, but systematic botanists will probably continue to claim them in the future, as in the past. Until the appearance of the monumental monograph of Rostafinski, the scattered and inaccessible literature, and above all the exceedingly meagre descriptions of the older botanists, rendered the determination of species almost impossible without a reference to the scattered types, which were still more inaccessible. Necessarily there was excessive reduplication of species, which is curiously illustrated in the Monograph, by the pages of synonyms of even some of the commoner species.

This difficult work of determination is now rendered easier by later and more accessible literature, especially by Cooke's translation from Rostafinski, of the British Myxomycetes, of which at least seventy-five species are also found in the United States.

It is not the intention of this paper to discuss the origin and developmental history of the plants or the plasmodium from which they are differentiated, but simply to suggest a study of interest to those whose limited time creates a necessity for specializing their work.

In the proper season in favorable locations, there may be seen ramifying on the surface of moist, decaying logs, for example, patches of a semi-fluid slime or plasmodium, varying in size and

in color from white or whitish grey to the deepest orange. If kept under observation, these masses will be found to be mobile, changing their position with a constant, ever varying current, until the conditions are favorable for the differentiation and formation of the mature plants. In some cases this maturation is accomplished with wonderful rapidity. I have seen a network of the rich yellow plasmodium of *Physarella mirabilis* covering a superficial area of two or three square feet of log surface, which developed in a single day its myriads of matured plants. The moist tan bark of the tan pits, masses of decaying leaves and herbage and decaying wood or vegetable material of any description, are the favorite places of development for the plasmodium, whence it flows over adjoining moss, leaves, growing plants and exceptionally even over moist rock and metallic objects. The vagaries of this mobile mass sometimes produce curious results. I recall an instance in which the plasmodium of *Diachea leucopoda* crept up a clump of blackberry stems to a foot in height and thence upon the radiating threads of a spider's web suspended between them, where it matured its exquisite sporangia.

With certain precautions these plants are neither difficult to collect nor preserve.

The question how and where to collect seems a simple one, and yet probably the experience of every mycologist teaches that no season or even collecting tour passes by without the acquisition of new facts in the ways and means of collecting. In this pursuit the "unexpected" is constantly occurring. Our most valued "finds" may occur in places which set our previous experience at defiance. These organisms are emphatically the creatures of warmth and moisture, and they may be found in any suitable locality which furnishes these requisites.

Generally stated, low damp copses, dense shady forests, glens in mountain forest regions, and the banks of brooks and streams are favorable collecting grounds in the proper season.

On account of the fragility of many of the species, the question of transportation and preservation is as important as that of collection. Of course many of the specimens may be wrapped in paper as other fungi, and carefully packed in the field, without destroying their scientific value, although broken by the process, but for other forms other means must be adopted.

The ingenuity of the botanist will readily suggest a safe means of transportation for the tender species, yet I may be pardoned for suggesting a simple method by which even the most fragile Cribrarias which a rude breath will crush, have safely borne the

jolting of Adirondack corduroy roads and the manipulations of the railroad baggage fiend.

For transportation I use pasteboard boxes, which may be of any convenient size (mine are 1½ by 3 inches), made with a deep lid and a stiff base, with simply a shoulder or shallow rim around it, high enough merely to serve as a bearing for the lid. The wood or other material bearing the specimens can be placed upon this base, held in position by light rubber bands, and the lid placed over all.

For herbarium preservation the Myxomycetes, after a thorough drying, should be placed in shallow boxes, which can then be arranged in the herbarium according to the general plan adopted by the individual botanist. Neglect of this simple precaution, originally, has caused the total loss by crushing of many of the type specimens in the Schweinitzian collection in the herbarium of the Academy of Natural Science of Philadelphia. It is also of great advantage to have these species boxes so arranged that they may be easily removed if required for study or comparison, to the stage of a microscope, where they may be examined by the aid of a condenser or a parabolic reflector. This simple method of study by reflected light not only facilitates comparison of stages of maturity and phases of variation of this very variable group, but is really essential as an aid to the determination of many species.

Few of the lower orders of plants equal these in beauty as microscopic objects, whether viewed in their entirety with the binocular or in their structural details with high powers. Some genera, as *Diachea* and *Lamproderma*, display a brilliant metallic or iridescent lustre of the sporangia walls. Others, of the *Physaraceæ* are characterized either by snowy crystals or highly-colored granules, orange, scarlet, lilac, or purple, of calcium carbonate. Still others, of the *Trichiaceæ* and *Arcyriaceæ*, by their beautiful spore and thread-markings and sculpturing, are worthy objects for the use of the higher lenses of the microscope.

The limited areas of our country which have been subjected to mycological search have been found rich in Myxomycetes, and our list of American species can and will undoubtedly be yet enriched with both new and rare forms as the large unexplored districts are examined by students.

In Fairmount Park, Philadelphia, eighty species have been found, and each year adds to the number. This result in so comparatively limited an area, simply shows what may be done in other favorable localities with a little faithful and systematic work.

According to Rostafinski (Supplement to Monograph) 229 species in all are known to science. There have been found, up to the present time, about 180 species within the limits of the United States, including a number of yet unrecorded species and omitting the uncertain or duplicated Schweinitzian species.

The physiological literature of this group has been recently enriched by "Die Pilzthiere oder Schleimpilze" of Zopf, which, with De Bary's Mycetozoa, epitomizes the latest knowledge of the subject.

For systematic study the "Monografia Sluzowce" of Rostafinski (in Polish) is exhaustive, but practically inaccessible to students in general. The ground, however, is largely covered for American students by the "Myxomycetes of Great Britain" (Cooke); the "Myxomycetes of United States" (Cooke); a list of all recorded American forms compiled from all published sources to the date of publication (Annals of New York Lyceum of Nat. Hist., 1876); the "New York State Reports" (Peck); and "Grevillea."

Notes on Carex.—IV.

BY L. H. BAILEY, JR.

1. CAREX TRICHOCARPA, Muhl., Gram. 257 (1817). Culms slender, 2 or 3 feet high: leaves narrow (2 to 3 lines wide), long pointed, scabrous, the sheaths smooth: staminate spikes two or three together on a slender peduncle 2 to 5 inches long, their scales appressed, obtuse or nearly so, usually erose: pistillate spikes cylindrical (about 2 inches long and 4 or 5 lines wide), mostly loosely flowered towards the base, the lower on exserted stalks: perigynium setose-hairy, conspicuously marked with ridge-like nerves, broadly ovate at the base, tapering rather abruptly into a cylindrical beak which is tipped by nearly upright teeth a line long, twice or more the length of the ovate scale.—Moist or wet grounds throughout the Northern States east of the Mississippi. A form with nearly lanceolate perigynia and shorter spikes from New York is the var. *turbinata* of Dewey, Sill. Journ. xi. 159 (1876).

Var. IMBERBIS, Gray, Man. 5th ed. 597 (1867). Perigynium smooth, teeth usually shorter, pistillate scales longer and sheaths scabrous.—New York, *Sartwell*, to Illinois, *S. B. Mead*, *E. Hall*.

Var. DEWEYI. Staminate scales very acute, mostly loose:

pistillate spikes rather thick (1 or 2 inches): perigynium very smooth, usually somewhat polished, rather coriaceous, the nerves not conspicuous, ovate-lanceolate and rounded, the teeth mostly short, usually a little rough: scales very acute, about the length of the perigynium.—*C. laviconica*, Dew., Sill. Journ. xxiv. 47 (1857). Big Sioux and Yellowstone rivers, *Hayden*, Bismarck, Dakota, *A. B. Seymour*, 1884, and northward. Very variable; the typical forms are slender with short pistillate spikes and short erect teeth, but they connect themselves in various ways with

Var. ARISTATA. Culm 2 to 4 feet high, mostly stout and often spongy below: leaves broad (4 to 6 lines), their under surface as well as the sheaths loosely hairy: staminate spikes more remote or often numerous and aggregated, their scales awl-pointed and more or less spreading: pistillate spikes usually thick, attenuated below: perigynium smooth, ovate-lanceolate, conspicuously nerved, terminating in very long (2 or 3 lines) awl-like mostly widely spreading teeth: scales awl-pointed, the lower often exceeding the perigynium.—*C. aristata*, R. Br. Narrative Frankl. Exped. Append. 764 (1823); *C. orthostachys*, C. A. Meyer, Fl. Alt. iv. 231 (1833); *C. mirata*, Dew., Wood's Bot. 593 (1848). Generally distributed from New England and Canada to Oregon, and far northward.

The characters of the plants here combined are so inconstant as to invalidate all specific distinctions and even to obliterate any marked varietal limits. Ordinarily the perigynia of *C. trichocarpa* are hairy and the sheaths smooth, while the perigynia of var. *aristata* are smooth and the sheaths hairy. These differences are entirely inconstant, however, so that all degrees and conditions of hairiness are found. The shapes of perigynia vary as widely as the pubescence.

2. C. VERRUCOSA, Muhl., Gram. 261 (1817) (*C. glaucescens*, Ell., and *C. verrucosa*, Ell., Chapm. Fl. 542). Of the species which has gone under the name of *C. glaucescens*, Ell., there are two forms, one characterized by a single and rather long-stalked staminate spike and drooping pistillate spikes, and the other by one to three short-stalked staminate spikes and the upper pistillate spikes erect. The first form was first described by Muhlenberg as *C. verrucosa* in 1817 and in 1824 by Elliott (Sketch Bot. S. C. and Georgia, 553) as *C. glaucescens*. The form with shorter stalks and more erect spikes is described by Elliott (l. c. 555) as "*C. verrucosa*, Muhl.?" The two forms are not sufficiently distinct to merit even a varietal separation. They were united by Dr.

Boott, who used the name *C. glaucescens*, as later writers have done. The priority of Muhlenberg's name does not appear to have been noticed. Var. *androgyna*, Curtiss, Sill. Journ. xliv. 84, is a form with androgynous terminal spike, "flowering in October, quite polymorphous." Var. *polystachya*, Curtiss, Sill. Journ. vii. 410, is a small and polystachyous autumnal form "apparently produced by having been cropped early in the season by cattle." These varieties are merely occasional forms. Otto von Bœckeler in Linnæa, xli. 292 (1877) refers the species to *C. Brasiliensis*, St. Hilaire, a later and apparently distinct species. Margins of ponds, mostly in pine barrens, Virginia to Florida and Texas.

3. C. CRINITA, Lam. This plant grows from Canada to South Carolina and Texas. It is widely variable in the size of all its parts. The only form which appears to possess characters of any permanence is the var. *gynandra*, which is distinguished by rough sheaths, more loosely flowered, pistillate spikes and stouter scales. *C. Mitchelliana*, Curtiss, Chapm. Flora, 536, is a form with an androgynous terminal spike. Olney in his Exsiccatæ quotes *C. Caroliniana*, Schw. An. Tab., as a synonym of one form of *C. gynandra*, but I can trace no resemblance to any form of *C. crinita* in Schweinitz's key which leads to his *C. Caroliniana*. The synonomy of the species, so far as I know it, may be arranged as follows:

C. CRINITA, Lam., Dict. de Bot. iii. 393 (1789).
Var. *paleacea*, Dew., Sill. Journ. x. 270 (1826).
C. Mitchelliana, M. A. Curtiss, Sill. Journ. xliv. 84 (1843).
Var. *minor*, Boott, Ill. i. 18 (1858).
C. Porteri, Olney, Exsicc. (1871).
Var. GYNANDRA, Schw. & Torr., Monogr. 360 (1825).
C. gynandra, Schw., An. Tab. (1824).
C. gynandra, var. *Caroliniana*, Olney, Exsicc. (1871).

4. C. HIRTA, L. Resembles *C. Houghtonii* and *C. trichocarpa*, but differs in its very remote and smaller pistillate spikes and its loosely hairy perigynia, sheaths and leaves.—Introduced from Europe. Ashland, Mass., 1877, *Thos. Morong*; in ballast, Philadelphia, 1880, *F. L. Scribner*; and about Boston, *Wm. Boott*. Mr. Morong writes me as follows in regard to this species: "I have collected it for several years in succession. I first found it by the roadside in rather low lands and afterwards in yards around dwellings, among grass. I presume from these situations that it must have been introduced into this locality."

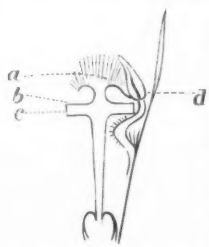
5. C. GRAYI, Carey, is sometimes found with hispid per-

igynia. Specimens from Athens, Ill. (*E. Hall*, 1861), and from Prof. Babcock, Ill., in Herb. Olney, are very sparsely hispid-hairy. Specimens from Greene county, N. Y. (*E. C. Howe*, 1869) are conspicuously so. Dr. Chapman finds similar specimens at Rome, Georgia. The species occurs as far east as New Jersey.

GENERAL NOTES.

Some Abnormal Rudbeckias.—While botanizing in Central Arkansas last summer, my attention was called to a patch of *Rudbeckia hirta*. There were about 50 plants in bloom, and in at least half of the heads more or less of the ray flowers were quilled. Sometimes only one ray in the head was abnormal; in other heads several, and in quite a number of heads all the rays were quilled. Normal and abnormal heads occurred on the same plant. Some of the plants bore several heads, all of which were abnormal. The abnormal flowers were generally shorter than the normal. There was a great difference in the amount of quilling even in the same head, varying from a mere ring at the base to a tube extending nearly to the top. The end of the ray was usually two-toothed, as in the normal form. The plants were normal in height and had faultless stems and leaves. I am unable to account for this general teratological display, or to assign a reason why normal and abnormal plants were growing side by side, much less to account for normal and abnormal heads occurring on the same plant.—F. L. HARVEY, *Fayetteville, Ark.*

Cross-pollination in Vinca minor.—Le Maout and Decaisne say that in *Vinca minor* the "pollen is granular, applied directly to the stigma." From the abundance of well-protected nectar, and the elaborate arrangement of parts in the neighborhood of stigma and anthers, cross-pollination seems at least to be the presumption. The accompanying figure shows the relations of the parts concerned. The pollen falls from the whole anther in a single mass (a habit becoming much more decided in the allied *Asclepiadaceæ*) upon the edge of the pollen shelf (*b*). Often the five masses of pollen are found lying upon this shelf at the same time. The outer face of the shelf (*c*) is very viscid. Although the anthers (*d*) extend well up toward the stigmatic surface (*a*), the pollen masses are guided by an arrangement of hairs down upon the disk below. A proboscis (or needle) thrust down the line of the nectar guides passes between contiguous anthers, and rubbing along the viscid ring becomes so smeared that when withdrawn the pollen masses lying upon the edge of the shelf are also withdrawn, not in a mass, but broken up into a line of pollen grains. Every insertion of a



a. Stigmatic surface: *b*. pollen shelf: *c*. viscid ring: *d*. anther.

needle shows a line of pollen stuck fast to it. By the same thrust any adherent pollen is rubbed off upon the stigmatic hairs above. We have thus a neat arrangement by which the proboscis is smeared with a mucilage just before it reaches the pollen grains.—W. E. HUMPHREY, *Botanical Laboratory, Wabash College.*

A New Grass.—DEYEUXIA MACOUNIANA. Culm 60 to 90cm. high, slender, leafy: sheaths mostly as long as the internodes, smoothish; ligule about 2mm. long, lacerate; leaf-blades narrow, 15 to 25cm. long, attenuated to filiform point: panicle 10 to 12cm. long, narrow, open, 2 to 4cm. in width, branches mostly in fives, approximate, slender, erect: spikelets somewhat crowded on the upper part of the branches, 2mm. long: empty glumes nearly equal, purplish, lanceolate, acute, finely scabrous on the back: flowering glumes 1½mm. long, ovate-oblong, somewhat truncate and 2-lobed at the apex, the lobes finely denticulate; awn above the middle of the glume, straight, reaching to the apex: palet about one-third shorter than its glume, bifid, denticulate at apex: hairs copious, as long as the flowering glume.

The panicle resembles that of *Agrostis vulgaris*, and the flowers are smaller than those of any other of our species.

Collected in the N. W. Territory, British America, by *J. M. Macoun*, for whom it is named.—GEO VASEY.

EDITORIAL NOTES.

PROF. DR. J. ROEPER died at Rostock, Germany, on March 17, aged 84 years.

DR. AND MRS. GRAY have returned in good health and spirits from their western trip.

J. C. DÖLL, author of the Flora of Baden, died at Karlsruhe, Germany, on March 10, at 77 years of age.

PROF. PLANCHON, of Montpellier, has received the De Candolle prize of 500 francs for his memoir on the *Ampelidees.*

DR. JOHAN GRÉSZ, author of a work entitled *De Potentillis Hungariæ*, died on February 19th, at Csáktornya, aged 72.

IT SEEMS THAT holly leaves above the reach of cattle often lose their leaf spines; which is on a par with *Polygonum amphibium* developing pubescence when lacking isolation by water.

A WELL ILLUSTRATED article, by Rev. J. L. Zabriskie, on some Ascomycetous fungi, which grow out from caterpillars, grubs and scale insects, is given in the April number of the *Journal of the N. Y. Microscopial Society.*

PROF. F. L. SCRIBNER, formerly of Girard College, has been appointed assistant botanist to the Department of Agriculture, and will devote his attention chiefly to microscopic fungi, especially those affecting and injuring cultivated plants.

MR. F. O. BOWER, lecturer on botany at the South Kensington Normal School of Science, has been called to the chair of botany in the University of Glasgow, made vacant by the recent resignation of Prof. Bayley Balfour.

DR. GIACOMO BIZZOZERO, of the Botanical Garden of Padua, Italy, and assistant in the Botanical Institute of the same place, died recently. The last volume of his Flora Veneta Crittogamica, for which he had the material prepared, will be issued under the charge of Prof. Saccardo.

MR. JOHN ROBINSON has prepared an extract from Professor Sargent's Forestry Report, showing the distribution, uses, specific gravities, strength, etc., etc., of the native woods of Essex county, Mass. The specimens were furnished by the Peabody Academy of Science, in whose reports this paper is printed.

THE THIRTY-SEVENTH ANNUAL REPORT on the N. Y. State Museum of Natural History for the year 1883 has been issued, but includes the introductory part only of the botanist's report by Mr. C. H. Peck. We learn that it is the intention to issue the full report of the botanist in the form of a separate bulletin.

FASCICLE II of American Medicinal Plants, published by Boericke & Tafel, of Philadelphia, has appeared. It is as elaborate as the other, with colored plates of plants, drawn from life by Dr. C. F. Millspaugh. This fascicle contains thirty plates, some of which are poor and others good, and ranging from *Hepatica* to *Equisetum*.

THE PROCEEDINGS of the Philadelphia Academy for the first quarter of 1885 contains Dr. Rothrock's paper on the internal cambium ring in *Gelsemium sempervirens*, Prof. Meehan on spicate inflorescence in *Cypripedium insigne*, and Mr. Scribner's revision of North American *Melicæ*, all of which have already been noticed in these pages.

THE ENUMERATION of the North American *cercosporeæ* with descriptions of the species by J. B. Ellis and B. M. Everhart, which has been running through several numbers of the *Journal of Mycology*, is brought to a close in the May number. It comprises 116 species on 122 hosts, and is a valuable contribution to the aids for study of this difficult group of plants. We hope it may be followed by a similar treatment of other genera.

MR. JAMES N. BISHOP, of Plainville, Conn., has published a catalogue of the phænogamous plants of his State, which appears to be the first attempt of the kind. Of course we are all familiar with the excellent Berzelius catalogue of Yale College, and it is somewhat of a surprise that a State catalogue has not before been attempted. Mr. Bishop neither numbers his species nor gives the totals, so that we are unable to contrast the display with that in other States.

IN THE CURRENT NUMBER (April) of the *Nuovo Giornale Botanico Italiano* Prof. Danielli gives an exhaustive study of *Agave Americana*, L., accompanied by seven plates, chiefly illustrating its histology. The paper is not only interesting in itself, but also as illustrating the multitude of subjects a single species suggests. In this case we have first a bibliography of the species, arranged by centuries, extending from 1533, and referring to 177 works. This is followed by the detailed history, description, synonymy, varieties, etc., and then the biology, morphology, and histology of each organ. At last geographical distribution is given, and uses, the latter subject being, as usual, a surprise to one not acqainted with the facts. Such papers should encourage our younger botanists, who are too apt to think that all important botanical work has been done.

DR. GEO. VASEY has issued a new and revised edition of his "Descriptive Catalogue of the Grasses of the United States." It contains several new genera

and about one hundred new species. The synopsis of tribes and generic descriptions have been very much improved. No region of botany contains a more vexed synonymy, or is troubled with a greater diversity of opinions in regard to affinities, but Dr. Vasey and Prof. Scribner have gotten them well in hand and promise eventually to straighten them out.

TERATOLOGY is a great study for those who can find much in it. A certain professor who will read this used to tell us that monstrosity was from *monstro*, meaning something pointed out, demonstrated. We grant the aptness of the definition, for morphological positions are in more cases than one propped up by teratology. But a set of the average "teratological notes" always reminds us of a "side-show museum," containing a three-legged calf, a double-headed rooster, and a man with six fingers.

A NEW COMMISSIONER of Agriculture brings to mind the nature of the work done by that department, generally followed by a thought concerning the work not done. The GAZETTE has been very abstemious in its remarks in this direction, but it imagines that the time for distributing seeds is about over, and the department is to enter upon a higher grade of work. There are many living questions in botany which demand investigation. Of course all physiological experiments find their proper relations in agricultural work, especially those relating to germination, but the crying need just now is for a general and systematic study of parasitic fungi. We have specialists fitted for the work, and it should be undertaken, not by one man, but by a commission resembling the entomological commission. It is to be hoped that the coming Congress will pay some attention to the memorial from the American Association, which should be more vigorously pressed at the Ann Arbor meeting.

THE PROCEEDINGS of the fourth and fifth meetings of the society for the promotion of agricultural science, which have just been issued, form a volume of 95 pages, with a strong botanical coloring. It opens with a paper by Dr. E. L. Sturtevant on Agricultural Botany, advocating the importance of considering the influence exerted by man in controlling variation as the key to the classification of cultivated plants. The value of leaves as an agent in promoting the growth of the plant is discussed by J. J. Thomas. A paper by Dr. W. G. Farlow on the *Peronospora* has already appeared in this journal. The remaining botanical papers are Bearing of Plowright's discovery as to the germination of rust spores upon the problem of wheat growing in the Northwest, by Prof. C. E. Bessey; a tomato disease, by Prof. B. D. Halsted; the vitality of seeds, by Prof. W. J. Beal; agricultural grasses of central Montana, illustrated, by F. Lamson Scribner; a list of cultivated food plants, by Dr. E. L. Sturtevant; and lecture on agricultural investigations, by Dr. J. H. Gilbert.

THE GAZETTE wishes to make an appeal to botanists in behalf of the meeting at Ann Arbor next August. Arrangements for the summer are now being made, and if it is within the bounds of possibility every botanist should lay his plans so as to devote a week to the American Association. A delightful place of meeting and one easy of access will bring a large attendance of the general association, and botanists should be well represented. The vigorous botanical club, now two years old, forms a great attraction, with its informal confabs, fraternal excursions, and general and hearty good fellowship. But for the credit of botany, before the biological section and the general association, we must protest against the customary practice of botanists, which is to have no paper, or something which would be better unsaid. The disjointed twaddle which so often offends the section, if it must be said, should be reserved for the privacy of the botanical club, which will guard its own family secrets. Every botanist should prepare a brief paper, as compact as possible, and to secure exactness and save time, it should be *written and read*. This thing of talking in a maudlin way for half an hour, when the same thing can be said a ten-

fold better way in a ten minute paper, is simply an outrage on a long-suffering section. We grant that papers are rather an excuse for getting together in a social way, but object to such a lame excuse.

CURRENT LITERATURE.

A Guide for the Microscopical Investigation of Vegetable Substances; from the German of Dr. Julius Wilhelm Behrens: translated and edited by Rev. A. B. Hervey, A. M., assisted by R. H. Ward, M. D., F. R. M. S. Pp. xv, 466. Boston: S. E. Cassino & Co. 1885.

During the two years in which Behrens's "Hilfsbuch" has been before the German-reading public, its merits have become so well known that there is need in this notice only to say a few words concerning the translation which, so long promised, has at last appeared.

The first glance at the book is very disappointing, because it shows a work elaborately bound, printed on stiff, heavy paper, and therefore utterly unsuited, as far as the publisher's skill can make it, for a "guide," the necessary idea of which is that it is to be always at hand and *convenient* for reference and study. Messrs. Cassino & Co. have published a number of valuable books within a few years, on which an almost universal criticism has been that they were not gotten up in a style suited to the subject matter of the book. This has been notably the case with Brooks's Invertebrate Zoology, Trelease's (Poulsen's) Botanical Microchemistry and Penhallow's Vegetable Histology. The present volume adds another to the list. When will publishers learn to adapt binding and paper to the book and cease to sacrifice the book to binding and paper?

The work of the translator has been well done: the only criticism that is to be offered is that there has been unnecessarily close adherence to the German idioms—a fault, however, which interferes only with the smoothness of the English and for which the translator begs pardon in advance.

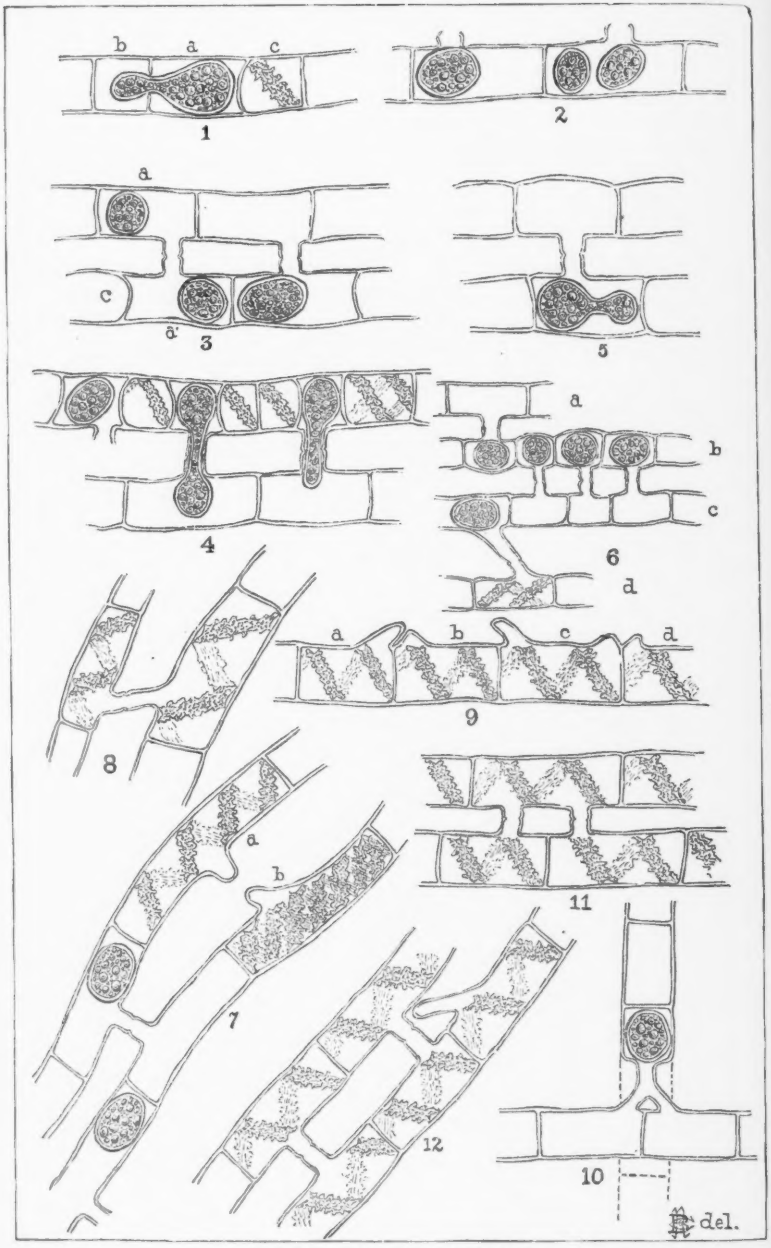
The work of editing has been too thoroughly done: indeed so many have been the interpolations and changes that were it retranslated Dr. Behrens would hardly recognize his own book. In some instances the additions have been valuable; in others they have been unnecessary, and injudicious in so far as they increase the cost and size of the book without correspondingly increasing its value.

To those not familiar with the work, it may be said that the most valuable part of the book to botanists is the last three chapters, which treat respectively of the preparation of microscopic objects, microscopical reagents, and the microscopical investigation of vegetable substances. Of these three, the last is especially important, not only because of the text itself, but by reason of the very complete bibliography which accompanies it.

Notwithstanding the sins of omission and commission on the part of the publishers and the high price of the book, it is one which every botanist engaged in histological work ought to have at his hand.

Catalogue of the Flora of Noble County, Indiana. By W. B. Van Gorder. Pp. 52. The author, Rome City, Ind., 1885.

We have in this catalogue the first attempt to get together a list of the flora of Noble county, and though necessarily incomplete, is a move in the right direction. No State east of the Mississippi river has had so little published in regard to its flora; a condition of things that sadly hampered the authors of the catalogue of the flora of the State when getting together their list in 1881. Mr. Van Gorder has been an assiduous collector, and in three years has added nearly thirty species to the list of the State, all from two or three of the northeastern counties. The present catalogue is creditable to his energy and zeal.



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